Abstract

A method and system are provided for simulating the metabolic consumption of oxygen contained in a breathable gas. A variable volume chamber cyclically increases/decreases in volume to receive the breathable gas/expel an exhaust gas. Hydrogen and carbon dioxide are introduced into the chamber to mix with the breathable gas to form the exhaust gas. Hydrogen is introduced in an amount sufficient to react with an amount of the oxygen in the exhaust gas equivalent to that used by a human during a selected level of activity. Carbon dioxide is introduced in an amount equivalent to that provided by a metabolic respiratory quotient associated with the same level of activity. A catalyst, exposed to the exhaust gas, causes a reaction between the hydrogen and oxygen in the exhaust gas to generate simulated human exhalation.